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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,120	10/10/2003	Christof Baur	34003.55	2728
27683	7590	10/26/2004	EXAMINER	
HAYNES AND BOONE, LLP 901 MAIN STREET, SUITE 3100 DALLAS, TX 75202			BERMAN, JACK I	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/684,120	BAUR ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jack I. Berman	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24-28 is/are allowed.
- 6) ☒ Claim(s) 1-23 and 29-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/30/04</u> . | 6) <input type="checkbox"/> Other: ____  |

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. Yamada et al. discloses a system for manipulating nanoscale objects comprising a passive surface on a substrate (at lines 25-26 in column 15 the example is given of a sapphire substrate with a passive (insulated) surface of hydrogen while at lines 55-58 in column 1, lines 41-46 in column 15, and lines 38-48 in column 16, the patent indicates that hydrogen-terminated silicon can be used as the substrate) and a scanning probe microscope (Yamada et al. uses a scanning tunneling microscope) wherein the scanning probe microscope has a tip that moves toward the surface to depassivate sites (remove hydrogen atoms from the sites) to form target positions for the subsequent placement of nanoscale objects (Yamada et al. gives the example of Mg atoms at lines 26-30 in column 15). While Yamada et al. does not state that fabrication design parameters comprising information on selected locations on the passive surface where target positions are to

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be formed for the subsequent placement of nanoscale objects and control algorithms operable to control operations of the scanning probe microscope are stored on a computer readable medium and that a processing unit operable to read the computer readable medium and operate under the control of the control algorithms and the fabrication design to cause the scanning probe microscope to depassivate sites of the passive surface associated with the target positions is provided, the range of movements of the scanning probe microscope are smaller than a human operator can perceive or control directly so the standard practice is to provide such processing units to control scanning probe microscopes in accordance with stored algorithms and selected site location data. It would therefore have been obvious to a person having ordinary skill in the art to provide the Yamada et al. system with a computer readable medium containing the required fabrication design parameters and control algorithms and a processing unit to read the medium and act in accordance with the stored parameters and algorithms.

Claims 1-3, 6-23, and 3-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. as applied to claims 29-32 above, and further in view of Eigler. Yamada et al. does not specify the source of the nanoscale objects to be deposited at the target positions by the scanning probe microscope tip; however, at lines 45-50 in column 1, Yamada et al. does state that the techniques for manipulating atoms required by the system disclosed in the Yamada et al. patent are those disclosed in the Eigler patent. This patent teaches that the atoms to be manipulated by a scanning probe microscope tip may be deposited on the surface of a substrate. The manipulation is then done by forming a bond between at least one of the plurality of nanoscale objects and the scanning probe microscope tip; moving the scanning probe microscope tip with the at least one nanoscale object bonded thereto to one of the target positions; forming a

bond between the nanoscale object and the target position; and breaking the bond between the scanning probe microscope tip and the nanoscale object. It would therefore have been obvious to a person having ordinary skill in the art to use the Eigler method to provide and manipulate the nanoscale objects (atoms) required by the Yamada et al. system since Yamada et al. states that this method represents the state of the art. Yamada et al. also teaches to image the substrate surface to confirm bond formation and breaking between the scanning probe microscope tip and the nanoscale objects, as is illustrated by the scanning tunneling microscope photographs shown in Figures 17 and 18. At lines 50-52 in column 15, Yamada et al. teaches that the temperature of the environment in which the disclosed method of manipulating nanoscale objects is practiced should be controlled in order to avoid thermal diffusion. Since Eigler teaches at lines 66-68 in column 3 that the method of using a scanning probe microscope to manipulate nanoscale objects can even be used to move the objects between different substrates, it would have been obvious to a person having ordinary skill in the art to use the method in the Yamada et al. system to move the objects between parts of a substrate that lie on different planes.

Claims 4, 5, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. and Eigler as applied to claims 1-3, 6-23, and 3-35 above, and further in view of Beton et al. While Yamada et al. and Eigler both teach to use scanning probe microscope tips to manipulate atoms, Beton et al. teaches that C<sub>60</sub> fullerene molecules can also be manipulated in the same way. It would therefore have been obvious to a person having ordinary skill in the art to use the Yamada et al./Eigler method discussed above to move C<sub>60</sub> fullerene molecules to the target positions.

Claims 24-28 are allowed.


The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach to provide nanoscale objects with reactive sites covered by caps that can be removed by a scanning probe microscope tip.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jack I. Berman  
Primary Examiner  
Art Unit 2881

jb  
10/25/04